

What Is Claimed Is:

1. A stage drive method in which a first stage and a second stage are independently driven within an area in a two-dimensional plane of a predetermined range including a first area where liquid is locally supplied and a second area located on one side of the first area in a first axis direction, wherein

during a transition from a first state in which one stage of the first stage and the second stage is positioned at the first area to a second state in which the other stage is positioned at the first area, the first stage and the second stage are simultaneously driven in a second axis direction intersecting the first axis direction while one of a state where the first stage and the second stage are close together in the second axis direction and a state where the first stage and the second stage are in contact in the second axis direction is maintained.

2. The stage drive method of Claim 1 wherein the first stage and the second stage are separately driven by a set of linear actuators that can engage freely detachable to both the first stage and the second stage and each of that can drive a specific stage in an engaged state in at least the second axis direction, and

during the transition, one stage of the first stage and the second stage is in an engaged state with one linear actuator of the set of linear actuators and the other stage

is in an engaged state with the other linear actuator, and after the transition, the engagement between both stages and the linear actuators are released respectively and then the one stage engages with the other linear actuator and the other
5 stage engages with the one linear actuator.

3. The stage drive method of Claim 1 wherein during the transition, the liquid continues to be retained on the stage positioned at the first area.

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4. The stage drive method of Claim 1 wherein measurement beams are irradiated on reflection surfaces of a first mirror and a second mirror, which are respectively arranged on the first stage and the second stage
15 on a surface besides the surface on the side where both stages are close or are in contact during the transition, and the position of the first and second stages is controlled based on reflection beams from the reflection surfaces of the first mirror and the second mirror.

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5. A stage drive method in which a first stage is driven within an area in a two-dimensional plane of a predetermined range including a first area and a second area located on one side of the first area in a first axis direction
25 where liquid is locally supplied, and a second stage is driven within an area of a predetermined range including the first area and a third area located on the other side of the first area in the first axis direction, wherein

during a transition from a first state in which one stage of the first stage and the second stage is positioned at the first area to a second state in which the other stage is positioned at the first area, the first stage and the second stage are simultaneously driven in the first axis direction while one of a state where the first stage and the second stage are close together in the first axis direction and a state where the first stage and the second stage are in contact in the first axis direction is maintained.

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6. The stage drive method of Claim 5 wherein during the transition, the liquid continues to be retained on the stage positioned at the first area.

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7. The stage drive method of Claim 5 wherein measurement beams are irradiated on reflection surfaces of a first mirror and a second mirror, which are respectively arranged on the first stage and the second stage on a surface besides the surface on the side where both stages are close or are in contact during the transition, and the position of the first and second stages is controlled based on reflection beams from the reflection surfaces of the first mirror and the second mirror.

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8. A stage unit, the unit comprising:
a first stage and a second stage that are independently driven within an area in a two-dimensional plane of a predetermined range, which includes a first area where liquid

is locally supplied and a second area located on one side of the first area in a first axis direction; and

5 a control unit that controls the first stage and second stage so as to simultaneously move the first stage and the second stage in a second axis direction intersecting the first axis direction while one of a state where the first stage and the second stage are close together in the second axis direction and a state where the first stage and the second stage are in contact in the second axis direction is maintained,
10 during a transition from a first state in which one stage of the first stage and the second stage is positioned at the first area to a second state in which the other stage is positioned at the first area.

15 9. A stage unit, the unit comprising:

a first stage that is movable within an area in a two-dimensional plane of a predetermined range including a first area and a second area located on one side of the first area in a first axis direction where liquid is locally
20 supplied;

a second stage that is movable within an area of a predetermined range including the first area and a third area located on the other side of the first area in the first axis direction; and

25 a control unit that controls the first stage and second stage so as to simultaneously move the first stage and the second stage in the first axis direction while one of a state where the first stage and the second stage are close together

in the first axis direction and a state where the first stage and the second stage are in contact in the first axis direction is maintained, during a transition from a first state in which one stage of the first stage and the second stage is positioned
5 in the first area to a second state in which the other stage is positioned in the first area.

10. An exposure apparatus that supplies a liquid to a space between a projection optical system and a substrate and exposes the substrate with an energy beam via the
10 projection optical system and the liquid, the apparatus comprising:

a first stage that is movable within an area of a predetermined range including a first area directly below the
15 projection optical system where the liquid is supplied and a second area located on one side of the projection optical system in a first axis direction;

a second stage that is movable within an area of a predetermined range including the first area and a third area
20 located on the other side of the projection optical system in the first axis direction;

a stage drive system that drives the first stage and the second stage, and simultaneously drives the first stage and the second stage in the first axis direction while one
25 of a state where the first stage and the second stage are close together in the first axis direction and a state where the first stage and the second stage are in contact in the first axis direction is maintained, during a transition from a first

state in which one stage of the first stage and the second stage is positioned in the first area to a second state in which the other stage is positioned in the first area;

a first mark detection system arranged above the second
5 area that detects a mark located on the first stage; and

a second mark detection system arranged above the third area that detects a mark located on the second stage.

11. The exposure apparatus of Claim 10 wherein
10 the first stage and the second stage are both stages on which substrates can be mounted.

12. The exposure apparatus of Claim 10 wherein
a part of the upper end portion in one stage of the
15 first stage and the second stage on the side facing the other stage is a plate shaped hangover portion protruding over other portion, and

a step portion that can engage with at least a tip portion of the portion via a predetermined clearance is
20 arranged in the other stage on at least a part of the surface facing the one stage, and in a state where the overhang portion and the step portion are engaged, a completely flat surface of a predetermined size can be formed by at least a part of the upper surface of the one stage and at least a part of the
25 upper surface of the other stage.

13. The exposure apparatus of Claim 10 wherein
the first stage and the second stage each have a plate

shaped overhang portion protruding over other portion in a part of the upper end portion on one side of a first axis direction, and a step portion that can engage with at least a tip portion of the overhang portion of the other stage via
5 a predetermined clearance on at least a part of a surface on the other side of the first stage and the second stage in the first axis direction, and

in a state where the overhang portion of one stage and the step portion of the other stage are engaged, a completely
10 flat surface of a predetermined size can be formed by at least a part of the upper surface of the one stage and at least a part of the upper surface of the other stage.

14. The exposure apparatus of Claim 10 wherein
15 the stage drive system maintains the state where the first stage and the second stage are close together during the transition, and

in at least one of the first stage and the second stage, a suppressing member is arranged so as to suppress leakage
20 of the liquid from a gap between the stages by being positioned in the gap between the stages during the transition.

15. The exposure apparatus of Claim 14 wherein
the suppressing member includes at least one of a seal
25 member and a water-repellent coating.

16. The exposure apparatus of Claim 10 wherein
during the transition, the liquid continues to be held

in the space between the projection optical system and the stage positioned at the first area.

17. The exposure apparatus of Claim 10, the apparatus
5 further comprising:

a first mirror and a second mirror arranged on the first stage and the second stage, respectively, on a surface besides the surface on the side where both stages are close together or are in contact during the transition; and

10 an interferometer that measures the position of the first stage and the second stage by irradiating measurement beams respectively on reflection surfaces of the first mirror and the second mirror, based on reflection beams from the reflection surfaces of the first mirror and the second mirror.

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18. An exposure apparatus that supplies a liquid to a space between a projection optical system and a substrate and exposes the substrate with an energy beam via the projection optical system and the liquid, the apparatus
20 comprising:

a first stage that is movable within an area of a predetermined range including a first area directly below the projection optical system where the liquid is supplied and a second area located on one side of the first area in a first
25 axis direction;

a second stage that is movable within an area of a predetermined range including the first area and a third area located on the other side of the first area in the first axis

direction; and

a stage drive system that drives the first stage and the second stage, and simultaneously drives the first stage and the second stage in the first axis direction while one of a state where the first stage and the second stage are close together in the first axis direction and a state where the first stage and the second stage are in contact in the first axis direction is maintained, during a transition from a first state in which one stage of the first stage and the second stage is positioned in the first area to a second state in which the other stage is positioned in the first area.

19. The exposure apparatus of Claim 18 wherein on the second stage, at least one of a part of a sensor that receives the energy beam via the projection optical system and a fiducial mark plate on which at least one fiducial mark is formed is arranged.

20. The exposure apparatus of Claim 18 wherein the second stage is used for measurement using photodetection results of the energy beam via the projection optical system and the liquid.

21. The exposure apparatus of Claim 18 wherein when exposing a substrate with the energy beam, the stage drive system drives the first stage based on at least a part of the measurement results using the second stage.

22. The exposure apparatus of Claim 21 wherein
the stage drive system drives each of the stages so
that measurement using the second stage is being performed,
while exchange of a substrate on the first stage is being
5 performed.

23. The exposure apparatus of Claim 18 wherein
on at least a part of the surface of the second stage
on the side facing the first stage, a reflection surface used
10 for position measurement of the second stage is arranged.

24. The exposure apparatus of Claim 18 wherein
a part of the upper end portion in one stage of the
first stage and the second stage on the side facing the other
15 stage is a plate shaped overhang portion protruding over other
portion, and

a step portion that can engage with at least a tip
portion of the overhang portion via a predetermined clearance
is arranged in the other stage on at least a part of the surface
20 facing the one stage, and in a state where the overhang portion
and the step portion are engaged, a completely flat surface
of a predetermined size can be formed by at least a part of
the upper surface of the one stage and at least a part of the
upper surface of the other stage.

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25. The exposure apparatus of Claim 18 wherein
the first stage and the second stage each have a plate
shaped overhang portion protruding over other portion in a

part of the upper end portion on one side of a first axis direction, and on at least a part of a surface on the other side of the stages in the first axis direction, a step portion that can engage with at least a tip portion of the overhang
5 portion of the other stage via a predetermined clearance is arranged, and

in a state where the overhang portion of one stage and the step portion of the other stage are engaged, a completely flat surface of a predetermined size can be formed by at least
10 a part of the upper surface of the one stage and at least a part of the upper surface of the other stage.

26. The exposure apparatus of Claim 18 wherein
the stage drive system maintains the state where the
15 first stage and the second stage are close together on the transition, and

in at least one of the first stage and the second stage, a suppressing member is arranged so as to suppress leakage of the liquid from a gap between the stages by being positioned
20 in the gap between the stages during the transition.

27. The exposure apparatus of Claim 26 wherein
the suppressing member includes at least one of a seal member and a water-repellent coating.

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28. The exposure apparatus of Claim 18 wherein
during the transition, the liquid continues to be held in the space between the projection optical system and the

stage positioned at the first area.

29. The exposure apparatus of Claim 18, the apparatus further comprising:

5 a first mirror and a second mirror arranged on the first stage and the second stage, respectively, on a surface besides the surface on the side where both stages are close together or are in contact on the transition; and

 an interferometer that irradiates measurement beams
10 on reflection surfaces of the first mirror and the second mirror and measures the position of the first stage and the second stage, based on reflection beams from the reflection surfaces of the first mirror and the second mirror.

15 30. An exposure apparatus that supplies a liquid to a space between a projection optical system and a substrate and exposes the substrate via the projection optical system and the liquid, the apparatus comprising:

 a first stage that is movable within an area of a
20 predetermined range including a first area directly below the projection optical system where the liquid is supplied and a second area located on one side of the first area in a first axis direction;

 a second stage that is movable independent from the
25 first stage within an area of a predetermined range including the first area and the second area; and

 a stage drive system that drives the first stage and the second stage, and simultaneously drives the first stage

and the second stage in a second axis direction intersecting the first axis direction while one of a state where the first stage and the second stage are close together in the second axis direction and a state where the first stage and the second stage are in contact in the second axis direction is maintained, during a transition from a first state in which one stage of the first stage and the second stage is positioned in the first area to a second state in which the other stage is positioned in the first area.

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31. The exposure apparatus according to Claim 30 wherein

the stage drive system includes a set of linear actuators that drive the first stage and the second stage separately, which can engage freely detachable to both the first stage and the second stage and each of which can drive a specific stage in an engaged state in the second axis direction.

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32. The exposure apparatus according to Claim 31, the apparatus further comprising:

a switching unit that switches a state where one stage of the first stage and the second stage is in an engaged state with one linear actuator of the set of linear actuators and the other stage is in an engaged state with the other linear actuator to a state where the one stage engages with the other linear actuator and the other stage engages with the one linear actuator after the transition.

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33. The exposure apparatus according to Claim 30 wherein

the first stage and the second stage are both stages
5 on which substrates can be mounted, and the apparatus further comprises:

a mark detection system disposed in the second area that detects a mark located on a specific stage, which is one of the first stage and the second stage positioned directly
10 under the mark detection system.

34. The exposure apparatus of Claim 30 wherein

the first stage and the second stage each have a plate shaped overhang portion protruding over other portion in a
15 part of the upper end portion on one side of a first axis direction, and on at least a part of a surface on the other side of the stages in the first axis direction, a step portion that can engage with at least a tip portion of the overhang portion of the other stage via a predetermined clearance is
20 arranged, and

in a state where the overhang portion of one stage and the step portion of the other stage are engaged, a completely flat surface of a predetermined size can be formed by at least a part of the upper surface of the one stage and at least a
25 part of the upper surface of the other stage.

35. The exposure apparatus of Claim 30 wherein

the stage drive system maintains the state where the

first stage and the second stage are close together during the transition, and

in at least one of the first stage and the second stage, a suppressing member is arranged so as to suppress leakage
5 of the liquid from a gap between the stages by being positioned in the gap between the stages during the transition.

36. The exposure apparatus of Claim 35 wherein the suppressing member includes at least one of a seal
10 member and a water-repellent coating.

37. The exposure apparatus of Claim 30 wherein during the transition, the liquid continues to be held in the space between the projection optical system and the
15 stage positioned in the first area.

38. The exposure apparatus of Claim 30, the apparatus further comprising:

a first mirror and a second mirror arranged on the first
20 stage and the second stage, respectively, on a surface besides the surface on the side where both stages are close together or are in contact during the transition; and

an interferometer that irradiates measurement beams on reflection surfaces of the first mirror and the second
25 mirror and measures the position of the first stage and the second stage, based on reflection beams from the reflection surfaces of the first mirror and the second mirror.

39. An exposure apparatus that supplies a liquid to a space between a projection optical system and a substrate and exposes the substrate via the projection optical system and the liquid, the apparatus comprising:

5 a first stage that is movable within an area including a first area directly below the projection optical system where the liquid is supplied and an area different from the first area;

 a second stage that is movable independent from the
10 first stage within the area including the first area and the area different from the first area;

 a stage drive system that drives the first stage and the second stage, and simultaneously drives the first stage and the second stage in a predetermined direction while a state
15 where the first stage and the second stage are close together in the predetermined direction is maintained, during a transition from a first state in which one stage of the first stage and the second stage is positioned in the first area to a second state in which the other stage is positioned in
20 the first area; and

 a suppressing member arranged in at least one of the first stage and the second stage, so as to suppress leakage of the liquid from a gap between the stages by being positioned in the gap between the stages during the transition.

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40. The exposure apparatus of Claim 39 wherein the suppressing member includes at least one of a seal member and a water-repellent coating.

41. The exposure apparatus of Claim 39 wherein
during the transition, the liquid continues to be held
in the space between the projection optical system and the
5 stage positioned in the first area.

42. The exposure apparatus of Claim 39, the apparatus
further comprising:

a first mirror and a second mirror arranged on the first
10 stage and the second stage, respectively, on a surface besides
the surface on the side where both stages are close together
or are in contact on the transition; and

an interferometer that measures the position of the
first stage and the second stage by irradiating measurement
15 beams respectively on reflection surfaces of the first mirror
and the second mirror, based on reflection beams from the
reflection surfaces of the first mirror and the second mirror.

43. A device manufacturing method that includes a
20 lithography step in which a substrate is exposed with the
energy beam, using the exposure apparatus according to any
one of Claims 10 to 42.